Ad Hoc #25

SECRET

3 October 1956

MEMORANDUM FOR: THE RECORD

SUBJECT : Visit to [redacted] 25X1

1. TIME AND PLACE OF MEETING: The meeting was held 27 September 1956 at [redacted] 25X1

2. ATTENDANCE: [redacted] 25X1

3. PURPOSE OF MEETING: To discuss the progress on the Contact Microphone Project (P-109B) and the Wall Measurement Program (Ad Hoc #25)

4. DISCUSSION:

a. Contact Microphone - P-109B

[redacted] found that their previous calibration tests, using wall mounts, were not accurate enough. In this test setup, a Massa Accelerometer was used as a standard and the unknown unit compared with it. Both units would be mounted in the same spot on a wall and driven with the same frequencies and intensities. However, under this test setup, the high frequencies did not show up. [redacted] has now gone to the use of a vibration detector and a shake table, similar to the one used by [redacted] 25X1 25X1 25X1

[redacted] has found that nearly every crystal microphone tested by them peaked somewhere around 1200 cps, regardless of who made it. [redacted] calculated the parameters of what they wanted in a crystal microphone mathematically, but have found so far, that in actual practice, their calculations do not hold true. More work is being done to ascertain why. The basic formulas [redacted] is using are: 25X1 25X1 25X1

$fr = \frac{T}{A}$ fr = frequence response
T = Thickness
A = Area

Sensativity = LW L = Length
W = Width

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[redacted] stated that the unloaded crystals cut to [redacted] specifications peaked at 1000 cps, then dropped sharply. The [redacted] mounted crystals were tested and it was found that they peaked at less than 1000 cps, then gradually dropped off in response. However, the sensativity of these microphones was exceptionally good. 25X1 25X1 25X1

[redacted] found that it was difficult to find a crystal microphone which possessed a good frequency response above 3000 cps. In testing commercial units, they found two which they considered acceptable. They are the Shure model 198 and a Brush BL301. This is a reversal of [redacted] previous stand that they could find no commercial units which they considered acceptable. Apparently this reverse decision is based on the fact that their earlier test results were not too accurate. 25X1 25X1

[redacted] designed several crystal units themselves, but found that none of their designs were as good as the two commercial units mentioned above. Both of these units have a broad frequency response, the Brush from 200-4000 cps and the Shure from 400-to about 4000 cps. [redacted] feels that these accelerometers meet the criterion they want, both frequency and sensitivity wise. These two units will now be field tested on various walls and articulation curves made of the results. [redacted] feels that these microphoned are sensitive enough so that no preamp will be necessary. 25X1 25X1

[redacted] made a small barium titanite transducer, but the results were poor. Further investigations have not been undertaken. In their articulation test setup, [redacted] uses a high pass filter which chops off everything below 600 cps. db levels of 30,40, 50, 60, and 80 are used. 25X1 25X1

[redacted] has now moved into the new Physics Building and the acoustic section has found, unfortunately, that the ambient noise level in the walls of their offices and labs is very high. This is due to the constant running of air compressors, located on the same floor and used with the electronic calculators on the upper floors. This has forced them to conduct field tests in other areas, with the inherent disadvantage of setting up and moving the required test equipment. 25X1

The next phase of this project will be to field test the Brush, Shure, [redacted] microphones and one [redacted] microphone to get a good monaural system. Mathematical calculations will also continue. It appears to the undersigned that [redacted] now has to do the basic research work which they had optimistically skipped before. It will be interesting to learn if the commercial units [redacted] likes prove to be good and if so, the question can be asked why [redacted] who tested many types, did not reach the same conclusions. 25X1 25X1 25X1 25X1 25X1

b. Wall Measurement Program - Ad Hoc #25

[redacted] has conducted a series of tests using a Sperry Reflective type ultra sonic measurement gauge. The results obtained so far have been negative. The frequency range of this instrument is from .5 to 50 MC. [redacted] stated that the higher frequencies are not satisfactory and that the lower frequencies offer more promise. [redacted] found that, although a signal could be obtained on some samples at the lowest frequency of this instrument, the three major obstacles to overcome were: (1) absorption in the wall, (2) dispersion of the wave due to peebles, aggregate, etc., in the wall, and (3) good contact on rough walls. The transducer must make a good contact or no results will be obtained. 25X1 25X1 25X1

It appears that [redacted] started this project without much thought of the problems involved. They now feel that their next step will be to make a literature check of the field to see what has been done; to determine the optimum frequency range and transducer size, and to try the instrument they have with a lower frequency range and a higher intensity. If poor results are still obtained [redacted] will try the resonance type ultrasonic gauge. 25X1 25X1

[redacted] has calculated that the reflective type of instrument is not capable of measuring walls less than 2" thick. According to their figures, at 40 KC, in a wall 2" or less the pulse travel time in and out is of such a duration that it becomes buried in the next pulse. 25X1

[redacted] tried the device on wood with no results. Measurements of a brick wall gave fairly good results, mainly due to the fact that a brick is fairly homogenous and the contact surface is fairly smooth. Measurements on cement walls up to 6" could be obtained if a transducer was used on each side. If only one transducer was used, a signal could be picked up; but the correlation was poor. [redacted] feels that it should be possible by the use of ultra sonics to measure cement walls up to 12" and possibly 20". However, they admit that at the moment they cannot substantiate this statement. 25X1 25X1

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TSS/APD

Distribution:
1 - P-109B
1 - AH-25
1 - Chrono
1 - AWB

AWB/ls

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